

WHAT IS CLAIMED IS:

1. A visceral fat determining device comprising:

input means for inputting personal data including an abdominal girth  $W_L$  which is a circumferential length of a trunk  
5 of a patient and a gluteal girth  $H_L$  which is a circumferential length of buttocks of the patient;

a data processing unit for storing the personal data and for calculating quantitative information on abdominal visceral fat of the patient based on the personal data; and

10 a display device for displaying the personal data and a result of the calculation performed by the data processing unit;

wherein the data processing unit calculates quantitative information on the abdominal visceral fat of the patient based  
15 on WHR which is a ratio ( $W_L/H_L$ ) of the abdominal girth  $W_L$  to the gluteal girth  $H_L$ .

2. The visceral fat determining device according to claim 1, wherein the quantitative information on the abdominal visceral fat is an amount of the abdominal visceral fat.

20 3. The visceral fat determining device according to claim 1 or 2, further comprising body fat ratio measuring means for measuring a bioelectrical impedance  $Z$  of the patient via electrodes contacted to end portions of the patient and for calculating a body fat ratio FAT of the patient based on the  
A5 25 measured bioelectrical impedance  $Z$  and the inputted personal data or a portion thereof,

wherein the body fat ratio FAT obtained by the body fat ratio measuring means is displayed on the display device.

4. A visceral fat determining device comprising:

30 input means for inputting personal data including an

abdominal girth WL which is a circumferential length of a trunk (waist size) of a patient and a gluteal girth HL which is a circumferential length of buttocks (hip size) of the patient;

5 a data processing unit for storing the personal data and for calculating an estimated value of an abdominal visceral fat cross sectional area VA of the patient based on the personal data; and

10 a display device for displaying the personal data and a result of the calculation performed by the data processing unit;

15 wherein the data processing unit stores a first regression coefficient of WHR and a first regression constant, WHR being a ratio (WL/HL) of an abdominal girth WL to an gluteal girth HL, the regression coefficient and the regression constant being obtained from statistical processing based on actual measurement values of the abdominal visceral fat cross sectional area VA measured in abdominal tomography of human bodies of random samples and respective WHR values of the human samples, the data processing unit calculating the estimated value of abdominal visceral fat cross sectional area VA of the patient based on a WHR value of the patient, the first regression constant of said WHR and the first regression coefficient.

5. A visceral fat determining device comprising:

25 input means for inputting personal data including an abdominal girth  $W_L$  which is a circumferential length of a trunk of a patient, a gluteal girth  $H_L$  which is a circumferential length of buttocks of the patient, height and weight of the patient;

30 a data processing unit for storing the personal data

and for calculating an estimated value of an abdominal visceral fat cross sectional area VA of the patient based on the personal data; and

5 a display device for displaying the personal data and a result of the calculation performed by the data processing unit;

wherein the data processing unit stores a second regression coefficient of WHR, WHR being a ratio ( $W_L/H_L$ ) of an abdominal girth  $W_L$  to an gluteal girth  $H_L$ , and a first regression coefficient of BMI, BMI being an index of corpulence, and a second regression constant, the regression coefficients and the regression constant being obtained from statistical processing based on actual measurement values of the abdominal visceral fat cross sectional area VA measured in abdominal tomography of human bodies of random samples and respective WHR values and BMI values of the human samples, the data processing unit calculating the estimated value of abdominal visceral fat cross sectional area VA of the patient based on a WHR value and a BMI value of the patient, the second regression coefficient of said WHR, the first regression coefficient of said BMI and the second regression constant.

6. A visceral fat determining device comprising:

input means for inputting personal data including an abdominal girth  $W_L$  which is a circumferential length of a trunk of a patient, a gluteal girth  $H_L$  which is a circumferential length of buttocks of the patient, height, weight, sex and age of the patient;

a data processing unit for storing the personal data and for calculating an estimated value of an abdominal visceral fat cross sectional area VA of the patient based on the personal

data;

a display device for displaying the personal data and a result of the calculation performed by the data processing unit; and

5           body fat ratio measuring means for measuring a bioelectrical impedance  $Z$  of the patient via electrodes contacted to end portions of the patient and for calculating a body fat ratio  $FAT$  of the patient based on the measured bioelectrical impedance  $Z$  and the inputted personal data or  
10   a portion thereof;

          wherein the data processing unit stores a third regression coefficient of  $WHR$ ,  $WHR$  being a ratio ( $W_L/H_L$ ) of an abdominal girth  $W_L$  to an gluteal girth  $H_L$ , a first regression coefficient of body fat ratio  $FAT$  and a third regression  
15   constant, the regression coefficients and the regression constant being obtained from statistical processing based on actual measurement values of the abdominal visceral fat cross sectional area  $VA$  measured in abdominal tomography of human bodies of random samples and respective  $WHR$  values and  $FAT$   
20   values of the human samples, the data processing unit calculating the estimated value of abdominal visceral fat cross sectional area  $VA$  of the patient based on a  $WHR$  value of the patient, a  $FAT$  value of the patient measured by the body fat ratio measuring means, the third regression coefficient of  
25   said  $WHR$ , the first regression coefficient of said  $FAT$  and the third regression constant.

7. A visceral fat determining device comprising:

          input means for inputting personal data including an abdominal girth  $W_L$  which is a circumferential length of a trunk  
30   of a patient, a gluteal girth  $H_L$  which is a circumferential

length of buttocks of the patient, height, weight and an abdominal subcutaneous fat thickness  $s$  of the patient;

a data processing unit capable of storing the personal data and performing calculation of an estimated value of an abdominal visceral fat cross sectional area  $VA$  of the patient  
5 based on the personal data; and

a display device for displaying the personal data and a result of the calculation performed by the data processing unit;

10 wherein the data processing unit stores a fourth regression coefficient of  $WHR$ ,  $WHR$  being a ratio ( $W_L/H_L$ ) of an abdominal girth  $W_L$  to an gluteal girth  $H_L$ , a second regression coefficient of  $BMI$ ,  $BMI$  being an index of corpulence, a first regression coefficient of the abdominal subcutaneous fat  
15 thickness  $s$  and a fourth regression constant, the regression coefficients and the regression constant being obtained from statistical processing of correlation among actual measurement values of the abdominal visceral fat cross sectional area  $VA$  measured in abdominal tomography of human  
20 bodies of random samples and respective  $WHR$  values,  $BMI$  values and abdominal subcutaneous fat thickness values  $s$  of the human samples, the data processing unit calculating the estimated value of abdominal visceral fat cross sectional area  $VA$  of the patient based on a  $WHR$  value, a  $BMI$  value and an abdominal  
25 subcutaneous fat thickness value  $s$  of the patient, the fourth regression coefficient of said  $WHR$ , the second regression coefficient of said  $BMI$ , the first regression coefficient of said abdominal subcutaneous fat thickness values  $s$  and the second regression constant.

30 8. The visceral fat determining device according to claim

7, wherein the data processing unit further calculates an abdominal subcutaneous fat cross sectional area SA based on the abdominal subcutaneous fat thickness s and the abdominal girth WL, of the patient.

5           9. The visceral fat determining device according to claim 8, wherein the data processing unit further calculates a ratio VSR between the estimated value of abdominal visceral fat cross sectional area VA and the abdominal subcutaneous fat cross sectional area SA, of the patient.

10           10. The visceral fat determining device according to claim 8, wherein the data processing unit further calculates a total abdominal fat cross sectional area WA based on the estimated value of abdominal visceral fat cross sectional area VA and the abdominal subcutaneous fat cross sectional area SA, of the patient.

15           11. A visceral fat determining device comprising:

input means for inputting personal data including an abdominal girth  $W_L$  which is a circumferential length of a trunk of a patient, a gluteal girth  $H_L$  which is a circumferential length of buttocks of the patient, height, weight, sex, age and an abdominal subcutaneous fat thickness s of the patient;

20           a data processing unit for storing the personal data and for calculating an estimated value of an abdominal visceral fat cross sectional area VA of the patient based on the personal data;

25           a display device for displaying the personal data and a result of the calculation performed by the data processing unit; and

30           body fat ratio measuring means for measuring a bioelectrical impedance Z of the patient via electrodes

contacted to end portions of the patient and for calculating a body fat ratio FAT of the patient based on the measured bioelectrical impedance Z and the inputted personal data or a portion thereof;

5            wherein the data processing unit stores a fifth regression coefficient of WHR, WHR being a ratio ( $W_L/H_L$ ) of an abdominal girth  $W_L$  to an gluteal girth  $H_L$ , a second regression coefficient of body fat ratio FAT, a second regression coefficient of the abdominal subcutaneous fat thickness s and  
10           a fifth regression constant, the regression coefficients and the regression constant being obtained from statistical processing of correlation among actual measurement values of the abdominal visceral fat cross sectional area VA measured in abdominal tomography of human bodies of random samples,  
15           and respective WHR values, FAT values and abdominal subcutaneous fat thickness values s of the human samples, the data processing unit calculating the estimated value of abdominal visceral fat cross sectional area VA of the patient  
20           based on a WHR value of the patient, a FAT value and an abdominal subcutaneous fat thickness value s measured by the body fat measuring means, the fifth regression coefficient of said WHR, the second regression coefficient of said FAT, the second regression coefficient of said abdominal subcutaneous fat thickness s, and the fifth regression constant.

25           12. The visceral fat determining device according to claim 11, wherein the data processing unit further calculates an abdominal subcutaneous fat cross sectional area SA based on the abdominal subcutaneous fat thickness s and the abdominal girth  $W_L$ , of the patient.

30           13. The visceral fat determining device according to

claim 12, wherein the data processing unit further calculates a ratio VSR between the estimated value of abdominal visceral fat cross sectional area VA and the abdominal subcutaneous fat cross sectional area SA, of the patient.

5 14. The visceral fat determining device according to claim 12, wherein the data processing unit further calculates a total abdominal fat cross sectional area WA based on the estimated value of abdominal visceral fat cross sectional area VA and the abdominal subcutaneous fat cross sectional area  
10 SA, of the patient.

15 15 The visceral fat determining device according to any one of claims 4, 5, 7, 8, 9 and 10, further comprising body fat ratio measuring means for measuring a bioelectrical impedance Z of the patient via electrodes contacted to end portions of the patient and for calculating a body fat ratio FAT of the patient based on the measured bioelectrical impedance Z and the inputted personal data or a portion thereof,

wherein the body fat ratio FAT obtained by the body fat ratio measuring means is displayed on the display device.

20 16. A visceral fat determining device comprising:

input means for inputting personal data including an abdominal girth  $W_L$  which is a circumferential length of a trunk of a patient, and a gluteal girth  $H_L$  which is a circumferential length of buttocks of the patient;

25 a data processing unit for storing the personal data and for calculating an estimated value of an abdominal visceral fat cross sectional area VA of the patient based on the personal data;

a display device for displaying the personal data and  
30 a result of the calculation performed by the data processing



unit; and

impedance measuring means for measuring a bioelectrical impedance  $Z$  of the patient via electrodes contacted to end portions of the patient and for calculation on the measured  
5 bioelectrical impedance  $Z$ ;

wherein the data processing unit stores a sixth regression coefficient of WHR, WHR being a ratio ( $W_L/H_L$ ) of an abdominal girth  $W_L$  to an gluteal girth  $H_L$ , a first regression coefficient of the bioelectrical impedance  $Z$  and a sixth regression constant, the regression coefficients and the  
10 regression constant being obtained from statistical processing of correlation among actual measurement values of the abdominal visceral fat cross sectional area  $VA$  measured in abdominal tomography of human bodies of random samples, and respective WHR values and bioelectrical impedance values  
15  $Z$  of the human samples, the data processing unit calculating the estimated value of abdominal visceral fat cross sectional area  $VA$  of the patient based on a WHR value of the patient, a bioelectrical impedance value  $Z$  of the patient measured by  
20 the body fat ratio measuring means, the sixth regression coefficient of said WHR, the first regression coefficient of said bioelectrical impedance  $Z$ , and the sixth regression constant.

17. A visceral fat determining device comprising:

25 input means for inputting personal data including an abdominal girth  $W_L$  which is a circumferential length of a trunk of a patient, and a gluteal girth  $H_L$  which is a circumferential length of buttocks of the patient;

a data processing unit for storing the personal data  
30 and for calculating an estimated value of an abdominal visceral

fat cross sectional area VA of the patient based on the personal data;

a display device for displaying the personal data and a result of the calculation performed by the data processing unit; and

impedance measuring means for measuring a bioelectrical impedance Z of the patient via electrodes contacted to end portions of the patient and for calculation on the measured bioelectrical impedance Z;

wherein the data processing unit stores a seventh regression coefficient of WHR, and a first regression coefficient of  $T_L^2/Z$  and a seventh regression constant, WHR being a ratio ( $W_L/H_L$ ) of an abdominal girth  $W_L$  to an gluteal girth  $H_L$ ,  $T_L^2/Z$  being obtained by dividing a squared height of a human by his bioelectrical impedance, the regression coefficients and the regression constant being obtained from statistical processing of correlation among actual measurement values of the abdominal visceral fat cross sectional area VA measured in abdominal tomography of human bodies of random samples, and respective WHR values and  $T_L^2/Z$  values of the human samples, the data processing unit calculating the estimated value of abdominal visceral fat cross sectional area VA of the patient based on a WHR value of the patient, a bioelectrical impedance value Z of the patient measured by the body fat ratio measuring means, a height value  $T_L$  inputted from the input means, the seventh regression coefficient of said WHR, the first regression coefficient of said  $T_L^2/Z$ , and the seventh regression constant.

18. The visceral fat determining device according to any one of claims 4 to 15, wherein the calculation of the

estimated value of abdominal visceral fat cross sectional area VA is performed with addition of a correction term by age and/or a correction term by sex, of the patient.

19. The visceral fat determining device according to  
5 any one of claims 4 to 18, wherein a plurality of ranking levels defined by a plurality of standard values are provided in advance for the abdominal visceral fat cross sectional area VA, the estimated value of the abdominal visceral fat cross sectional area VA given by the calculation being displayed  
10 on the display device in conformity with the ranking levels.

20. The visceral fat determining device according to  
any one of claims 1 to 19, wherein the abdominal girth  $W_L$  is provided by an abdominal girth at the fourth lumbar vertebrae of the patient, and the gluteal girth  $H_L$  is provided by a girth  
15 measured generally at the thickest portion on the buttocks of the patient.

21. The visceral fat determining device according to  
any one of claims 1 to 20, further comprising size measuring means for measuring the abdominal girth  $W_L$  and the gluteal  
20 girth  $H_L$ .

22. The visceral fat determining device according to  
claim 21, wherein the abdominal girth  $W_L$  and the gluteal girth  $H_L$  measured by the size measuring means are inputted to the  
data processing unit.

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